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# Research Note

NORTHERN ROCKY MOUNTAIN  
FOREST AND RANGE EXPERIMENT STATION

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## CONVERSION OF STANDARD POLE CLASSES TO TREE DIAMETERS IN LODGEPOLE PINE

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Increasing demands for lodgepole pine poles make the knowledge of pole specifications essential to timber men. However, American Standards Association pole class dimensions, expressed as circumferences of peeled, seasoned poles 6 feet from the butt are difficult to work with when one has become accustomed to measuring the diameter of trees at breast height  $\frac{1}{2}$  outside bark. In order to overcome this difficulty, table 1 has been prepared. This table gives the average minimum d.b.h. (diameter at breast height) outside bark that will make a pole of each class and length.

Table 1.-- D.B.H. Dimensions for Lodgepole Pine Poles

A.S.A. pole class	Minimum top diam. inside bark seasoned (inches)	Length of Pole (feet)										
		25	30	35	40	45	50	55	60	65	70	75
		Minimum diameter at breast height outside bark (inches)										
10	3.8	$\frac{1}{2}$										
9	4.8	"	$\frac{1}{2}$									
8	5.7	"	"	$\frac{1}{2}$								
7	4.8	8.1	8.8	9.3	9.9	10.4	10.9					
6	5.4	8.8	9.5	10.0	10.7	11.2	11.8	12.1				
5	6.1	9.5	10.2	10.9	11.6	12.1	12.6	13.1	13.5			
4	6.7	10.2	11.1	11.8	12.4	13.0	13.6	14.2	14.7	15.0		
3	7.3	10.9	11.9	12.6	13.3	14.0	14.7	15.2	15.7	16.1	16.6	
2	8.0	11.8	12.8	13.5	14.3	15.0	15.7	16.2	16.7	17.3	17.8	18.3
1	8.6	12.6	13.6	14.5	15.4	16.1	16.7	17.3	17.9	18.5	19.0	19.5

$\frac{1}{2}$  No minimum, any d.b.h. that will make the required top diameter.

$\frac{1}{2}$  Breast height is  $4\frac{1}{2}$  feet from the ground level.

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# THE UNIVERSITY OF CHICAGO DIVISION OF PHYSICS

CHICAGO, ILL., U.S.A.

The following table gives the results of the measurements of the rate of change of the magnetic field with time, as determined from the induction method, for the various values of the magnetic field, and for the various values of the frequency of the alternating current. The values of the rate of change of the magnetic field, as determined from the induction method, are given in the first column of the table, and the values of the rate of change of the magnetic field, as determined from the induction method, are given in the second column of the table. The values of the rate of change of the magnetic field, as determined from the induction method, are given in the third column of the table, and the values of the rate of change of the magnetic field, as determined from the induction method, are given in the fourth column of the table.

Table 1.--Rate of change of magnetic field with time.

Frequency of alternating current (cycles per second)	Rate of change of magnetic field (gauss per second)										Rate of change of magnetic field (gauss per second)	Rate of change of magnetic field (gauss per second)
	10	20	30	40	50	60	70	80	90	100		
10	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	1.0	1.0
20	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	2.0	2.0
30	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	3.0	3.0
40	4.0	8.0	12.0	16.0	20.0	24.0	28.0	32.0	36.0	40.0	4.0	4.0
50	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0	5.0	5.0
60	6.0	12.0	18.0	24.0	30.0	36.0	42.0	48.0	54.0	60.0	6.0	6.0
70	7.0	14.0	21.0	28.0	35.0	42.0	49.0	56.0	63.0	70.0	7.0	7.0
80	8.0	16.0	24.0	32.0	40.0	48.0	56.0	64.0	72.0	80.0	8.0	8.0
90	9.0	18.0	27.0	36.0	45.0	54.0	63.0	72.0	81.0	90.0	9.0	9.0
100	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	10.0	10.0

In all instances, the rate of change of magnetic field was measured at the same rate as the rate of change of the magnetic field.

The rate of change of magnetic field is given in gauss per second.

To arrive at these figures, measurements were taken of 24 pole trees in the Hyalite Creek Drainage of the Gallatin National Forest and 65 trees on the Deerlodge National Forest in Montana.

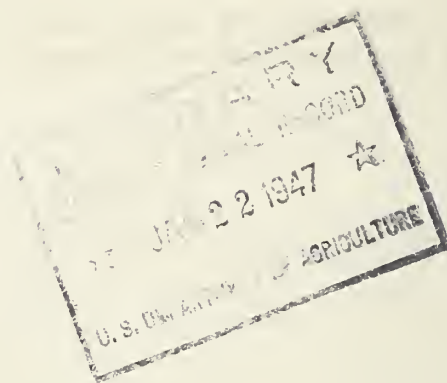
A 3.33 percent allowance was made for shrinkage which is the maximum that could occur, neglecting the effect of checking, in seasoning to 15 percent moisture content.<sup>2/</sup> To determine the average minimum d.b.h. outside bark for the table, the A.S.A. dimensions were adjusted for shrinkage and the d.b.h. determined from the tree measurements.

Tentative examinations indicate that this table may not be adaptable to stands on poor sites where taper is great or to young thick-barked trees. It should, however, be useful as a guide until data are collected for specific areas.

When peeling machines are used, additional allowances will have to be made to correct for the amount of wood shaved off with the bark.

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<sup>2/</sup> "Effect of Direction of Growth Rings on the Relative Amount of Shrinkage in Width and Thickness of Lumber and the Effect of Radial and Tangential Shrinkage on Dimensions of Round Timbers." Forest Products Laboratory publication No. R1473, March 1945.



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Conversion of standard pole classes to tree diameters in lodgepole pine

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